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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,907	01/23/2004	Michael Ben Sellers	139773	1906

7590  
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01/18/2007

EXAMINER

WEATHERBY, ELLSWORTH

ART UNIT

PAPER NUMBER

3768

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/18/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/707,907

Applicant(s)

SELLERS, MICHAEL BEN

Examiner

Ellsworth Weatherby

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 1/23/2004, 2/02/2004.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

1. Claim 9 is objected to because of the following informalities: Applicant states in claim 9, "...each of the conductive particles..." There is no antecedent basis in the parent claim for this limitation. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Boskamp (PGPub. 2003/0206017).

Boskamp '017 teaches a gradient coil assembly for use in an MRI device, comprising: a gradient tube extending along an axis, the tube including first and second gradient coils and a conductive compound disposed between the first and second gradient coils. (See (0045) & (0047) describing inner gradient coils having conductive elements on a support structure such as fiberglass resin composite tube. It is inherent that adjacent gradient coils will then have intervening conductive compound.)

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 in view of Kuth (PGPub No. 2002/0121956).

The disclosure of Boskamp '017 teaches all the limitations of the claimed invention except for expressly teaching that a conductive compound comprises an epoxy resin having a plurality of conductive particles.

In the same field of endeavor, Kuth '956 teaches as old in the art using a conductive compound comprising an epoxy resin having a plurality of conductive particles, e.g. carbon particles. (0006, referring to plastic profiles surrounding the gradient coils including carbon fibers and epoxy resin).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the gradient coil assembly of Boskamp '017 with the epoxy resin having a plurality of carbon particles as taught by Kuth '956. The motivation to modify Boskamp '017 would have been to provide a system that further increased the stiffness of the gradient coil in order to counter high oscillations caused by gradient coil current (see for motivation to combine, Kuth '956, (0006)).

6. Claims 4 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 and Kuth '956 as applied to claims 2 and 15 above, and further in view of Damadian (U.S. Patent No. 6,973,711).

Boskamp '017 in view of Kuth '956 teaches all the limitations of the claimed invention except for expressly teaching that the conductive compound further includes a chemical hardening compound.

In the same field of endeavor, Damadian '711 teaches using a conductive compound that includes a chemical hardening compound (col. 5, lines 4-19).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the modified invention of Boskamp '017 with the conductive compound that includes a chemical hardening compound as taught by Damadian '711, in order to reduce the curing time of the conductive compound disposed between the gradient coils.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 in view of Kuth '956 as applied to claim 2 above, and further in view of Lehne et al. (U.S. Patent No. 5,235,283).

The modified invention of Boskamp '017 teaches all the limitations of the claimed invention except for expressly teaching that the epoxy resin comprises a bisphenol-A resin.

In the same field of endeavor, Lehne et al. '283 teaches using an epoxy resin that comprises a bisphenol-A resin (col. 4, lines 39-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the modified invention of Boskamp '017 with the epoxy resin that comprises a bisphenol-A resin as taught by Lehne '283. The motivation to combine the two would have been to use any of the commercially available conductive compounds that are suitable for casting gradient coil systems, as taught by Lehne '283.

8. Claims 6, 7, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 in view of Kuth '956.

The disclosure of Boskamp '017 teaches all the limitations of the claimed invention except for expressly teaching that the conductive compound comprises a polyester resin that comprises a plurality of conductive compounds. Boskamp '017 also does not teach that the plurality of conductive compounds comprise one of carbon particles, silver particles, copper particles, and gold particles.

In the same field of endeavor, Kuth '956 teaches using a polyester resin between gradient coils that comprises a plurality of conductive compounds, e.g. carbon particles (0006).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the modified invention of Boskamp '017 with the polyester resin conductive compound as taught by Kuth '956. The motivation to combine the two would have been to provide a structurally reinforced gradient coil assembly, as taught by Kuth '956.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 and Kuth '956 as applied to claim 6 above, and further in view of Damadian '711.

The modified invention of Boskamp '017 teaches all the limitations of the claimed invention except for expressly teaching that the conducting compound further includes a chemical hardening compound.

Damadian '711 teaches using a conductive compound that includes a chemical hardening compound (col. 5, lines 4-19).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the modified invention of Boskamp '017 with the compound having a chemical hardener as taught by Damadian '711. The motivation to combine the two would have been to reduce the curing time of the conductive compound disposed between the gradient coils.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 in view of Dietz et al. (U.S. Patent No. 6,642,717).

The disclosure of Boskamp '017 teaches all the limitations of the claimed invention except for expressly teaching that a conductive compound further comprises of conductive particles that are less than 10 micrometers in diameter.

In the same field of endeavor, Dietz et al. '717 teaches using a conductive compound that comprises of conductive particles that are less than 10 micrometers in diameter (col. 3, lines 25-30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the gradient coil assembly of Boskamp '017 with conductive particles that are less than 10 micrometers in diameter as taught by Dietz et al. 717. The motivation to combine the two would have been to provide a conductive compound that has assured high thermal conductivity, as taught by Dietz et al. 717.

11. Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 in view of Dean et al. (PGPub No. 2002/0196020).

The disclosure of Boskamp '017 teaches all the limitations of the claimed invention except for expressly teaching that the conductive compound limits current flow through the compound to less than a predetermined current value.

In the same field of endeavor, Dean et al. '020 teaches using a conductive compound in a gradient coil assembly that limits current flow through the compound to less than a predetermined value (0027).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the gradient coil assembly of Boskamp '017 with the current limiting compound that limits current flow through the compound to less than a preferred value as taught by Dean et al. '020. The motivation to combine the two would have been to reduce patient discomfort from heat that would arise from current flowing between coils.



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12. Claims 11 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 and Dean et al. '020 as applied to claims 10 and 19 above, and further in view of Leussler (PGPub No. 2004/0155656).

The modified invention of Boskamp '017 teaches all the limitations of the claimed invention except for expressly teaching that the conductive compound limits current flow through the compound to less than 10 microamps.

In the same field of endeavor, Leussler '656 teaches a conductive compound that limits current flow through the compound to less than 10 microamps (0031).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the gradient coil assembly of Boskamp '017 with the current limiting compound that limits current flow through the compound to less than 10 microamps as taught by Leussler '656. The motivation to combine the two would have been to reduce patient discomfort from heat that would arise from current flowing between coils.

13. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 in view of Dean et al. '020.

Boskamp '017 teaches a gradient coil assembly for use in an MRI device, comprising: a gradient tube extending along an axis, the tube including first and second gradient coils and a potting compound disposed between the first and second gradient coils (0045). Boskamp '017 does not teach the potting compound layer having a

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plurality of conductive particles configured to limit a current flowing through the compound layer to less than a predetermined current value.

In the same field of endeavor, Dean et al. '020 teaches a potting compound layer having a plurality of conductive particles configured to limit a current flowing through the compound layer to less than a predetermined current value (0027).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the gradient coil assembly of Boskamp '017 with the current limiting potting compound layer as taught by Dean et al. '020. The motivation to combine the two would have been to reduce patient discomfort from heat that would arise from current flowing between coils.

14. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Boskamp '017 in view of Lehne et al. '283.

The disclosure of Boskamp '017 teaches all the limitations of the claimed invention except for using a vacuum to impregnate the conductive compound between the first and second gradient coils.

In the same field of endeavor, Lehne et al. '283 teaches using a vacuum to impregnate the conductive compound between the first and second gradient coils (col. 4, lines 50-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the gradient coil assembly of Boskamp '017 with the vacuum used to impregnated the conductive compound between the first and second

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gradient coils as taught by Lehne et al. '283. The motivation to combine the two would have been to ensure that a homogeneous molded material which is free of voids is achieved and that even narrow gaps and undercuts are filled with casting resin, as taught by Lehne et al. '283.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ellsworth Weatherby whose telephone number is (571) 272-2248. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on (571) 272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

  
ELENI MANTIS MERCADER  
SUPERVISORY PATENT EXAMINER

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EW

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